REMARKS

Present Status of the Application

Claims 6, 9, 12-18 are pending in the application.

Claims 6 and 9 are allowed, and claim 16 is objected but allowable if rewritten into independent form.

Claims 12-15 and 17-18 are rejected, in which claims 12, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al., (US 5,990,978) in view of Kim et al., US 6,822,691 and Parikh US 6,414,719 (Fig. 3), and claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al., (US 5,990,978) in view of Kim et al., US 6,822,691, and Parikh US 6,414,719, and AAPA.

Applicants have cancelled claim 12 and rewritten claims 13 and 15 into independent form which are incorporated all limitations of claim 12 thereto. Claims 17 and 18 are amended to correct the dependency. New claims 19 and 20 are newly added, which are the same as previously presented claims 17 and 18, but depend on claim 15.

Interview Summary

Applicants first wish to express their sincere appreciation for the time that Examiner spent with Applicant's Attorney during a telephone discussion on April 24, 2008 regarding the outstanding Office Action. Applicants believe that certain important issues were identified during the telephone discussion, and that they are resolved herein.

During the conversation, the examiner acknowledged that the present invention teaches motion detection using a pixel, rather than a block as taught by Kim' 978, and agrees that the current claim language is acceptable in this regard. The examiner further acknowledged that

the present invention teaches using the 4 frames and an analog signal directly as an input for motion detection, while Kim '978 discloses using 2 frames and a digital signal as an input for motion detection. The examiner, however, still insisted for an explanation on why it is not obvious to use a pixel over a block, analog signal over digital signal, and 4 frames over 2 frames in view of the teachings of Kim. The examiner further requested an explanation of unexpected results of the claimed invention.

In view of the request set forth above, Applicants have cancelled claim 12 and rewritten claims 13 and 15 into independent form which are incorporated all limitations of claim 12. The further explanation and reasons are introduced hereafter.

Discussion of Office Action Rejections

Claims 12, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al., (US 5,990,978) in view of Kim et al., US 6,822,691 and Parikh US 6,414,719 (Fig. 3).

Claim 12 is cancelled from the application.

With respect to claim 13, Applicants believe that none of the cited references has taught, disclosed, or suggested the claim limitation:

> "***sampling*** a composite video signal ***to obtain a sampled data $F_{m+1}P_{x,y}$, wherein $F_{m+1}P_{x,y}$ represents a sampled data of a y^{th} pixel on an x^{th} line of an $(m+1)^{th}$ frame in the composite video signal***, and m, x, y are positive integers greater than or equal to 0, wherein ***the composite video signal is a signal for an NTSC system, and sampling the composite video signal uses a frequency which is 4 times the subcarrier frequency in the composite video signal to sample***; and

obtaining three stored sampled data $F_mP_{x,y}$, $F_{m-1}P_{x,y}$, $F_{m-2}P_{x,y}$, *previously sequentially sampled directly from the composite video signal and stored in a storing means, wherein the sampled data* $F_{m+1}P_{x,y}$ *and the three previously sequentially sampled data* $F_mP_{x,y}$, $F_{m-1}P_{x,y}$, $F_{m-2}P_{x,y}$ *are obtained by directly sampling the composite video signal when the subcarrier phase is equal to 0, 0.5π, π, and 1.5π, sequentially....*

using the sampled data $F_{m+1}P_{x,y}$ *and the three stored sampled data* $F_mP_{x,y}$, $F_{m-1}P_{x,y}$, $F_{m-2}P_{x,y}$ *to determine a motion/still status of the composite video signal, comprising:*

using $F_{m+1}P_{x,y}$, $F_mP_{x,y}$, $F_{m-1}P_{x,y}$, *and* $F_{m-2}P_{x,y}$ *to calculate and obtain a plurality of max differences* $MD_{x,y}$, *wherein* $MD_{x,y}$ *represents a max difference of the* y^{th} *pixel on the* x^{th} *line;*

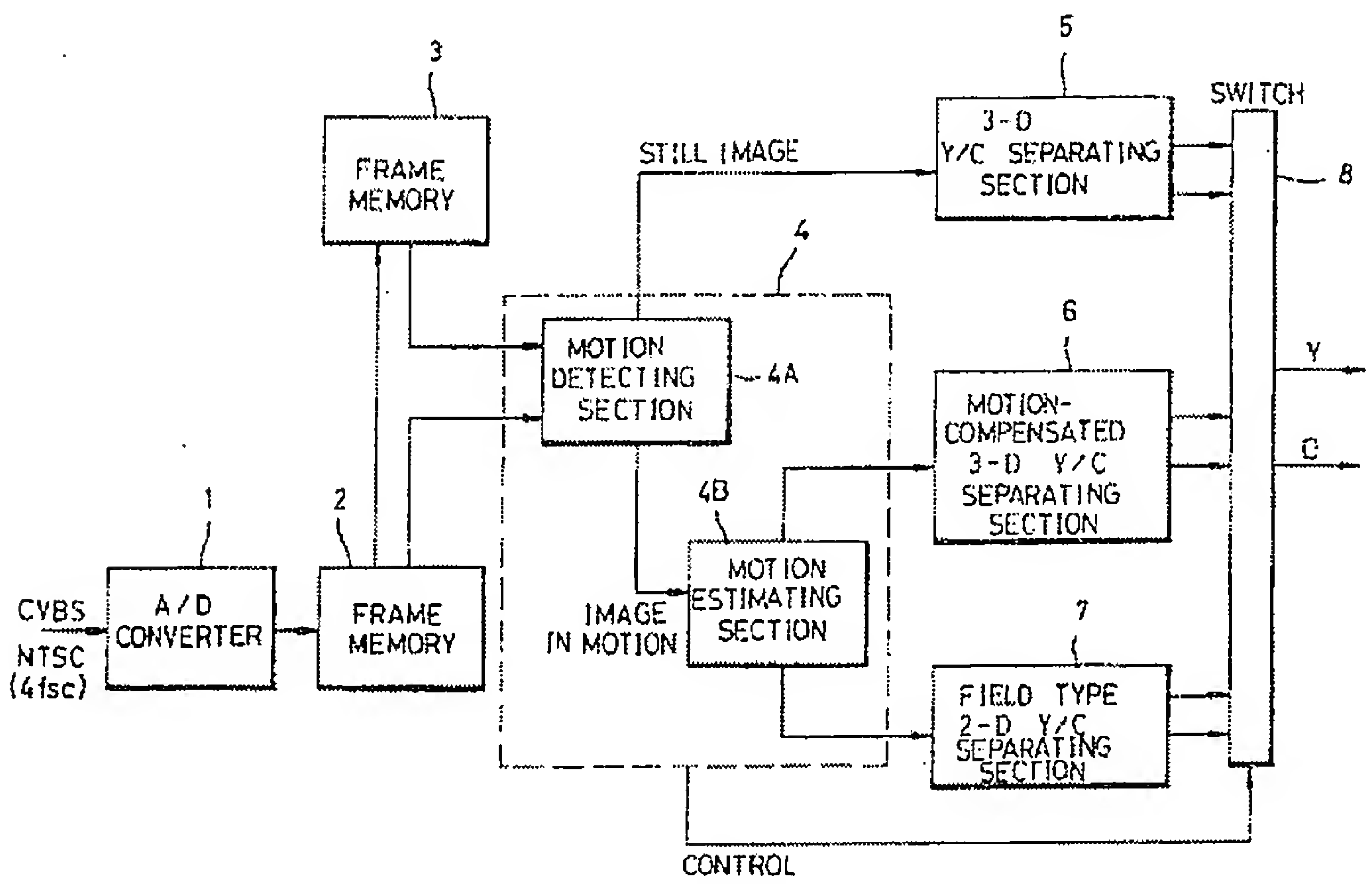
averaging 4 max differences of the contiguous pixels selected to obtain a motion factor $MF_{x,y}$, *wherein* $MF_{x,y}$ *represents a motion factor of the* y^{th} *pixel on the* x^{th} *line; and*

detecting $MF_{x,y}$ *to determine the motion/still status of the* y^{th} *pixel on the* x^{th} *line in the composite video signal"*

which is new and untaught by all of the cited references.

Kim et al. '978 reference teaches: "... **the digital composite video signal is stored in**

the frame memory 2. The composite video signal read out from the frame 2 is then stored in the frame memory 3, being delayed by one frame. As a result, **the frame memory 3 stores** the composite video signal of **the current frame (i.e., N-th frame)**, and the frame memory 2 stores the composite video signal of **the previous frame** (i.e., (N-1)-th frame) (col. 3, line 63 - col. 4, line 2; emphasis added).



Applicants submit that Kim et al. '978 reference teaches to store the digital composite video itself and **<u>frames</u>** in memories for comparison later and **<u>fails to teach</u>** sampling the composite video so as to obtain "**<u>a sampled data $F_{m+1}P_{x,y}$</u>**". Such a sampled data $F_{m+1}P_{x,y}$ **<u>is a pixel at a certain position in the frame</u>** for comparison instead of the entire frame.

In a similar manner, the recited limitation of "**obtaining three stored sampled data $F_mP_{x,y}$, $F_{m-1}P_{x,y}$, $F_{m-2}P_{x,y}$,** previously sequentially sampled directly from the composite video signal", is also not taught, disclosed, or suggested by Kim '978, or any of the other cited references, taken alone or in combination.

Applicants further submitted that the recited limitation of "*a method of motion detection for a 3D comb filter video decoder..... **sampling the composite video signal uses a frequency which is 4 times the subcarrier frequency in the composite video signal to***

***sample*......*the sampled data* $F_{m+1}P_{x,y}$ *and the three previously sequentially sampled data* $F_mP_{x,y}$, $F_{m-1}P_{x,y}$, $F_{m-2}P_{x,y}$ *are obtained by directly sampling the composite video signal when the subcarrier phase is equal to 0, 0.5π, π, and 1.5π, sequentially*", is also not taught, disclosed, or suggested by Kim '978, further in view of Kim et al., US 6,822,691 and Parikh US 6,414,719 (Fig. 3), AAPA or any of the other cited references, taken alone or in combination.

The claimed invention provides a method of motion detection for a 3D comb filter video decoder. As disclosed in paragraph [0011] of the Description of the Related Art in originally filed specification and FIG.3A, it is stated that "the conventional 3D comb filter, the motion detector 330 is responsible for determining whether the composite video signal 301 is a motion video signal or a still video signal. A conventional motion detector 330 first receives the composite video signal 301 and a luma data 321a (which is provided by the separated video signal 321), then uses the luma data 321a and the composite video signal 301 to **calculate a luma difference and a chroma difference for the two frames**, then determines a motion/still status of the pixel according to the luma difference and the chroma difference, and finally outputs a selection signal 331." However, as disclosed, the luma difference and a chroma difference calculated from the two frames and used for motion detection have some problem if the intra-field Y/C separation is not accurately performed. The result of the motion detection will be greatly impacted.

The claimed invention provides a method of motion detection for a 3D comb filter video decoder based on original composite video signal.

As disclosed in paragraph [0019] of the originally filed specification, max difference of

each sampled pixels are used for motion detection.

[0019] According to an embodiment of the present invention, when it is determined that the composite video signal is a signal for the NTSC system, the step of sampling the composite video signal uses a frequency which is 4 times the subcarrier frequency in the composite video signal to sample the signal, and the signal is sampled when the subcarrier phase is equal to 0, 0.5π, π, and 1.5π. Meanwhile, $MD_{x,y}$ is calculated based on the equation: $MD_{x,y} = Max\{ |F_mP_{x,y} - F_{m-2}P_{x,y}| , |F_{m+1}P_{x,y} - F_{m-1}P_{x,y}| \}$.

However, as disclosed in paragraph [0037] of the originally filed specification, **only using the max difference $MD_{x,y}$ of each pixel as the motion factor is not appropriate**. It is proposed to sampling the composite video signal using a frequency which is 4 times the subcarrier frequency in the composite video signal. The claimed method makes use of the features of the composite video signal in NTSC or PAL system to perform the motion detection for a 3D comb filter video decoder.

[0037] However, since **the attribute each sample point is not the same, only using the max difference $MD_{x,y}$ of each pixel as the motion factor is not appropriate**. For example, if each pixel of the (m+1)th frame is red, and each pixel of all other frames are white. The luma Y of white color is much higher than the luma Y of red color, the chroma V of red color is much higher than the chroma V of

white color, and even chroma U of both colors have a little difference, and the difference is small. Therefore, when Y+V of the white color is compared with Y+V of the red color, the difference is small. However, when Y-V of the white color is compared with Y-V of the red color, its difference is very big. When comparing Y+U with Y-U, different differences are obtained. In other words, even when color A is compared with color B with the same method, different differences are obtained if the items being compared are not the same. If the motion factor of each pixel is determined by each pixel itself, the motion factor exhibits a sine wave. Therefore, it is required to use 4 pixels as a group to determine the final motion factor (both in NTSC and PAL).

It is respectfully submitted that the features of "a method of motion detection for a 3D comb filter video decoder..... **sampling the composite video signal uses a frequency which is 4 times the subcarrier frequency in the composite video signal to sample**......the sampled data $F_{m+1}P_{x,y}$ and the three previously sequentially sampled data $F_mP_{x,y}$, $F_{m-1}P_{x,y}$, $F_{m-2}P_{x,y}$ are obtained by directly sampling the composite video signal when the subcarrier phase is equal to 0, 0.5π, π, and 1.5π, sequentially, ...using $F_{m+1}P_{x,y}$, $F_mP_{x,y}$, $F_{m-1}P_{x,y}$, and $F_{m-2}P_{x,y}$ to calculate and obtain a plurality of max differences $MD_{x,y}$, wherein $MD_{x,y}$ represents a max difference of the y^{th} pixel on the x^{th} line; averaging 4 max differences of the contiguous pixels selected to obtain a motion factor $MF_{x,y}$, wherein $MF_{x,y}$ represents a motion factor of the y^{th} pixel on the x^{th} line; and detecting $MF_{x,y}$ to determine the motion/still status of the y^{th} pixel on the x^{th} line in the composite video signal" are also

not taught, disclosed, or suggested by Kim '978, further in view of Kim et al., US 6,822,691 and Parikh US 6,414,719 (Fig. 3), AAPA or any of the other cited references, taken alone or in combination.

Even that "sampling at 4 times the subcarrier and when the subcarrier phase is within the conventional range" could be found in the Kim et al., US 6,822,691 and Parikh US 6,414,719 (Fig. 3) or AAPA, it is respectfully submitted that there is no suggestion or motivation in any of the cited references to provide "a method of motion detection for a 3D comb filter video decoder.... .using $F_{m+1}P_{x,y}$, $F_mP_{x,y}$, $F_{m-1}P_{x,y}$, and $F_{m-2}P_{x,y}$ to calculate and obtain a plurality of max differences $MD_{x,y}$, wherein $MD_{x,y}$ represents a max difference of the y^{th} pixel on the x^{th} line; averaging 4 max differences of the contiguous pixels selected to obtain a motion factor $MF_{x,y}$, wherein $MF_{x,y}$ represents a motion factor of the y^{th} pixel on the x^{th} line: and detecting $MF_{x,y}$ to determine the motion/still status of the y^{th} pixel on the x^{th} line in the composite video signal" as claimed.

On the contrary, Kim et al. '978 reference teaches: "... **the digital composite video signal is stored in the frame memory 2**. The composite video signal read out from the frame 2 is then stored in the frame memory 3, being delayed by one frame. As a result, **the frame memory 3 stores** the composite video signal of **the current frame (i.e., N-th frame)**, and the frame memory 2 stores the composite video signal of **the previous frame** (i.e., (N-1)-th frame) (col. 3, line 63 - col. 4, line 2; emphasis added). If the Kim et al. '978 is combined with the teaching in the Kim et al., US 6,822,691 and Parikh US 6,414,719 (Fig. 3) or AAPA, at least four frame memories should be implemented in the Kim et al. '978, not only the frame memory 2 and frame memory 3. It is taught away from the object of the Kim

et al. '978 "to provide a Y/C signal separating device capable of providing a high quality image by performing the Y/C signal separation in accordance with the level of image motion which is detected in the unit of a block" (Col. 2, Line 19-24, Kim et al. '978)

Eeven if the cited references were combined, the teaching of the cited references still could not remedy the deficiency of the deficiency of the Kim et al. '978 because at least the feature of "*averaging 4 max differences of the contiguous pixels selected to obtain a motion factor $MF_{x,y}$, wherein $MF_{x,y}$ represents a motion factor of the y^{th} pixel on the x^{th} line; and detecting $MF_{x,y}$ to determine the motion/still status of the y^{th} pixel on the x^{th} line in the composite video signal*" could not be found in the Kim et al. '978 in view of Kim et al., US 6,822,691 and Parikh US 6,414,719 (Fig. 3) or AAPA.

Thus, any such combination would not yield the "a method of motion detection for a 3D comb filter video decoder" of the present invention, as claimed in independent Claim 13, as none of the cited references disclose or suggest "providing *using $F_{m+1}P_{x,y}$, $F_mP_{x,y}$, $F_{m-1}P_{x,y}$, and $F_{m-2}P_{x,y}$ to calculate and obtain a plurality of max differences $MD_{x,y}$, wherein $MD_{x,y}$ represents a max difference of the y^{th} pixel on the x^{th} line; averaging 4 max differences of the contiguous pixels selected to obtain a motion factor $MF_{x,y}$, wherein $MF_{x,y}$ represents a motion factor of the y^{th} pixel on the x^{th} line; and detecting $MF_{x,y}$ to determine the motion/still status of the y^{th} pixel on the x^{th} line in the composite video signal*".

As such, for at least the foregoing reasons, claim 13, and its dependent claims 14, 17-18 are then submitted to be novel and unobvious over the Kim '978, Kim '691, and Parikh '719, and thus should be allowed.

As the same reason set forth above, Claims 15, 16 and newly added claims 19 and 20

are also submitted to be novel and unobvious over the Kim '978, Kim '691, and Parikh '719, and thus should be allowed

CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims 6, 9, 13-20 are in proper condition for allowance and an action to such effect is earnestly solicited. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,

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